

IN THE CLAIMS:

1 1-5 (Cancelled)

1 6. (Currently Amended) A method for creating and maintaining a plurality of virtual serv-
2 ers within a server, the method comprising the steps of:

3 partitioning resources of the server to establish an instance of each virtual server
4 by allocating units of storage and network addresses of network interfaces of the server to
5 each instance of the virtual server, and sharing an operating system and a file system of
6 the server among all of the virtual servers;

7 enabling controlled access to the resources using logical boundary checks and se-
8 curity interpretations of those resources within the server by comparing configuration in-
9 formation of a unit of storage requested by a particular vserver with the resources allo-
10 cated to that particular vserver; and

11 providing a ~~vfiler~~ virtual server context structure including information pertain-
12 ing to a security domain of the ~~vfiler~~ virtual server.

1 7. (Currently Amended) The method of Claim 6 wherein the step of allocating comprises
2 the step of providing a vfstore list of the ~~vfiler~~ virtual server context structure, the vstore
3 list comprising pointers to vfstore soft objects, each having a pointer that references a
4 path to a unit of storage allocated to the vfiler.

1 8. (Currently Amended) The method of Claim 7 wherein the step of allocating further
2 comprises the step of providing a vfnet list of the ~~vfiler~~virtual server context structure,
3 the vfnet list comprising pointers to vfnet soft objects, each having a pointer that refer-
4 ences an interface address data structure representing a network address assigned to the
5 ~~vfiler~~virtual server.

1 9. (Currently Amended) The method of Claim 8 wherein the step of enabling further
2 comprises the step of performing a ~~vfiler~~virtual server boundary check to verify that a
3 ~~vfiler~~virtual server is allowed to access certain storage resources of the filer.

1 10. (Original) The method of Claim 9 wherein the step of performing comprises the step
2 of validating a file system identifier and qtree identifier associated with the units of stor-
3 age.

1 11. (Currently Amended) The method of Claim 10 wherein the step of performing further
2 comprises the steps of:

3 for each request to access a unit of storage, using the identifiers to determine
4 whether the ~~vfiler~~virtual server is authorized to access the unit of storage;

5 if the ~~vfiler~~virtual server is not authorized to access the requested unit of storage,
6 immediately denying the request;

7 otherwise, allowing the request; and

8 generating file system operations to process the request.

1 12. (Cancelled)

1 13. (Currently Amended) A system adapted to create and maintain a plurality of virtual
2 servers within a server, the system comprising:

3 | a storage media configured to store information as units of storage resources, the
4 units of storage resources allocated among each of the virtual servers;

5 | one or more network interfaces assigned one or more network address resources,
6 the network address resources allocated among each of the virtual servers;

7 an operating system having a file system resource adapted to perform a boundary
8 check to verify that a request is allowed to access to certain units of storage resources on
9 the storage media, each virtual server allowed shared access to the file system, where the
10 boundary check is performed by comparing configuration information of a unit of storage
11 requested by a particular vserver with the one or more units of storage resources and the
12 one or more network address resources allocated to that particular vserver;

13 a context data structure provided to each virtual server, the context data structure
14 including information pertaining to a security domain of the virtual server that enforces
15 controlled access to the allocated and shared resources; and

16 a processing element coupled to the network interfaces and storage media, and
17 configured to execute the operating and file systems to thereby invoke network and stor-
18 age access operations in accordance with results of the boundary check of the file system.

1 14. (Original) The system of Claim 13 wherein the units of storage resources are volumes
2 and qtrees.

1 15. (Original) The system of Claim 14 further comprising a plurality of table data struc-
2 tures accessed by the processing element to implement the boundary check, the table data
3 structures including a first table having a plurality of first entries, each associated with a
4 virtual server and accessed by a file system identifier (fsid) functioning as a first key into
5 the table, each first entry of the first table denoting a virtual server that completely owns
6 a volume identified by the fsid.

1 16. (Original) The system of Claim 15 wherein the table data structures further include a
2 second table having a plurality of second entries, each associated with a virtual server and
3 accessed by a second key consisting of an fsid and a qtree identifier (qtreeid), each sec-
4 ond entry of the second table denoting a virtual server that completely owns a qtree iden-
5 tified by the fsid and qtreeid.

1 17. (Original) The system of Claim 16 wherein the server is a filer and wherein the vir-
2 tual servers are virtual filers.

1 18. -19. (Cancelled)

1 20. (Currently Amended) Apparatus adapted to create and maintain a plurality of virtual
2 ~~filers~~ servers (~~vfilers~~ vservers) within a ~~filer~~ server, the apparatus comprising:
3 means for allocating dedicated resources of the ~~filer~~ server to each ~~vfiler~~ server;

4 means for sharing common resources of the filer-server among all of the ~~vfilers-~~
5 vservers; and

6 means for enabling controlled access to the dedicated and shared resources using
7 logical boundary checks and security interpretations of those resources within the server
8 and for providing a ~~vfiler~~-vserver context structure including information pertaining to a
9 security domain of the ~~vfiler~~vserver, where the logical boundary checks are performed by
10 comparing configuration information of a unit of storage requested by a particular vserver
11 with the dedicated resources allocated to that particular vserver.

1 21. -22. (Cancelled)

1 23. (Currently Amended) A computer readable medium containing executable program
2 instructions for creating and maintaining a plurality of virtual ~~filers-servers~~ (~~vfilers-~~
3 vservers) within a filer, the executable program instructions comprising program instruc-
4 tions for:

5 allocating dedicated resources of the filer-server to each ~~vfiler~~vserver;
6 sharing common resources of the filer-server among all of the ~~vfilers~~vservers; and
7 _____ enabling access to the dedicated and shared resources using logical boundary
8 checks and security interpretations of those resources within the server and providing a
9 ~~vfiler~~-vserver context structure including information pertaining to a security domain of
10 the ~~vfiler~~vserver, where the logical boundary checks are performed by comparing con-
11 figuration information of a unit of storage requested by a particular vserver with the dedi-
12 cated resources allocated to that particular vserver.

1 24. -25. (Cancelled)

1 26. (Currently Amended) A method for creating and maintaining a plurality of virtual
2 servers within a server, the method comprising the steps of:

3 allocating resources to each instance of the virtual servers of the plurality of serv-
4 ers, the resources including units of storage and network addresses of network interfaces
5 of the server to each instance of the virtual server;

6 using boundary checks to access resources allocated to the virtual servers, where a
7 particular virtual server is limited by the boundary check to only access the resources as-
8 signed to that particular virtual server, where the logical boundary checks are performed
9 by comparing configuration information of a unit of storage requested by a particular
10 vserver with the resources allocated to that particular vservers.

1 27. (Currently Amended) An apparatus adapted to create and maintain a plurality of vir-
2 tual servers within a server, comprising:

3 means for allocating resources to each instance of the virtual servers of the plural-
4 ity of servers, the resources including units of storage and network addresses of network
5 interfaces of the server to each instance of the virtual server;

6 means for using boundary checks to access resources allocated to the virtual serv-
7 ers, where a particular virtual server is limited by the boundary check to only access the
8 resources assigned to that particular virtual server, where the logical boundary checks are

9 | performed by comparing configuration information of a unit of storage requested by a
10 | particular vserver with the resources allocated to that particular vserver.

1 | 28. (Currently Amended) A system adapted to create and maintain a plurality of virtual
2 | servers within a server, the system comprising:

3 | a storage media configured to allocate resources to each of the virtual servers of
4 | the plurality of servers, the resources including units of storage and network addresses of
5 | network interfaces of the server to each instance of the virtual server network interfaces
6 | assigned one or more network address resources, the network address resources allocated
7 | among each of the virtual servers;

8 | an operating system adapted to perform a boundary check to verify access to re-
9 | sources allocated to the virtual servers, where a particular virtual server is limited by the
10 | boundary check to only access the resources assigned to that particular virtual server,
11 | where the logical boundary checks are performed by comparing configura-
12 | tion of a unit of storage requested by a particular vserver with the resources allocated to
13 | that particular vserver.

Please add new claims 29 *et al.*

- 1 29. (New) A method for creating and maintaining one or more virtual servers within a
2 server, comprising:
- 3 allocating resources to a first virtual server of the one or more virtual servers,
4 where the resources include one or more units of storage and at least one network address
5 of one or more network interfaces of the server to a first virtual server of the one or more
6 virtual servers;
- 7 requesting a first unit of storage of the one or more units of storage by a first vir-
8 tual server; and
- 9 using a boundary check to access the first unit of storage by comparing configura-
10 tion information of the first unit of storage with resources allocated to the first virtual
11 server.
- 1 30. (New) The method of claim 29, wherein the configuration information is an inode
2 from a requested file.